1)Cauchy's Riemann Equations in Cartesian form

$\frac{\partial u}{\partial x} = \frac{\partial v}{\partial y}$ and $\frac{\partial u}{\partial y} = - \frac{\partial v}{\partial x}$

2) Cauchy's Riemann Equations in polar form

$\frac{\partial u}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta}$ and $\frac{\partial v}{\partial r} = - \frac{1}{r} \frac{\partial u}{\partial \theta}$

3) Milne Thomson's Method: To find f(z) in terms of z when u(x, y) and v(x, y) are given. If f'(z)= $\frac{\partial u}{\partial x} + i \frac{\partial v}{\partial x}$ is given then $\frac{\partial u}{\partial x}, \frac{\partial v}{\partial x}$ being functions of x, y by substituting x=z and y= 0 we get f' (z) in terms of z. By integration we get f(z) in terms of z.

4) Cauchy's theorem: If (z) is analytic on and within closed curve c then $\oint_c f(z)dz = 0$

5) Cauchy's Integral Formula: $f^n(a) = \frac{n!}{2\pi i} \oint_c \frac{f(z)}{(z-a)^{n+1}} dz$

6) Cauchy's Residue Theorem: If f(z) is analytic on and within a closed contour c except at finite number of

isolated singular points within c then

$\oint_c f(z)dz = 2\pi i(r1 + r2 + r3 + \ldots + r_n)$ where r1,r2....r_n are the residues at the singular points within c.

7) Residue at the pole z = a of order n is given as r $= \frac{1}{(n-1)!}\left[\frac{d^{n-1}}{dz^{n-1}}\{(z-a)^n f(z)\}\right]_{z=a}$